Chapter Two

Changing Institutions and Policy Needs: The SPR and Oil Markets in the 1990s

Although the threat of economic losses from oil supply disruptions remains, the likelihood of disruptions is smaller today, and the magnitude of economic loss from a disruption of any given size is probably smaller as well. As a result, releasing oil from the Strategic Petroleum Reserve today in response to any particular disruption would offer fewer benefits in terms of avoiding economic losses than in the past. Economic benefits from releasing oil from the SPR would still come through its contribution to lowering oil imports and lowering oil prices. But the precise contribution from selling a given volume of SPR oil would depend on both the nature of the supply crisis and how the government goes about the sale.

How the Economic Impact of Supply Disruptions Has Changed

The Department of Energy's current view of how a release of SPR oil affects oil markets and conveys benefits to the economy may no longer be accurate. Since the nation's basic policies and programs for dealing with energy emergencies first evolved, important changes have occurred in other energy policies and in the structure of oil markets. Those changes point to smaller economic benefits and costs from releasing SPR oil in response to a disruption of world oil supplies. Two reasons account for those diminished benefits. First, oil markets have changed in ways that make a major loss of oil supplies less disruptive than in the past. For example, the response of oil prices to a loss of supplies comes faster, and the resulting drop in the nation's use of imported oil is bigger. Consequently, the final increase in oil prices is smaller and does not stay high as long. Second, the economy has changed in ways that lessen the prospect of economic losses from higher prices. For example, the contribution of oil to the nation's economic output is smaller, and oil consumers in some sectors of the economy are more able to reduce their oil use on short notice.

Viewing the Oil Market's Response to World Supply Disruptions

Changes over the past two decades have altered the way oil markets respond to a sudden loss of oil supplies. Among the most important of those changes has been the end of price and allocation controls on petroleum, the growth of oil futures markets, the increased diversification of oil sources, and the development of increased capabilities to switch among energy sources.

A Faster Price Response: The End of Price Controls and the Growth of New Markets. The economy labored under petroleum price and allocation regulations on petroleum during the oil price shocks of 1974 and 1979 to 1980. The phaseout of price and allocation rules began in the late 1970s, but final decontrol for all categories of crude oil and all refined petroleum products did not come until January 1981.

Box 1.
Current Oil Markets Are in Transition

Changes in oil markets over the past 20 years have encompassed three phases. Up to the mid-1970s, oil was sold almost exclusively at posted prices or under long-term, fixed-price contracts. With posted prices, the world's largest oil companies established both the price they would pay for a certain quality of crude oil and the markups to that price for variations in oil quality. Price controls in the United States replicated the system of posted prices. For the major oil companies that also refined oil and sold petroleum products, crude oil prices were little more than internal transfer costs--important for tax reasons but not for overall profitability. For the national oil companies of the oil-exporting nations, royalty arrangements were more important than oil prices in determining their oil revenues. During this period, price managers wanted stability, and energy prices varied little with short-term changes in supply and demand.

By the late 1970s, a growing number of independent companies were entering the oil market and the national oil companies were asserting their independence. At the same time, a growing share of world oil was selling on a spot basis or under short-term contracts; later it was sold through flexible pricing provisions in long-term contracts. With this flexible pricing, oil prices that companies reported became much more responsive to current and expected market conditions. Prices also became much more uncertain.

The 1980s witnessed the widespread development of formal and informal market institutions for buying and selling crude oil and petroleum products for future delivery at prices set today. Those forward markets, including the government-regulated futures markets and options markets, developed in response to flexible pricing as traders sought new ways to hedge against and speculate in price uncertainty. The availability of forward markets also eased the reluctance of many companies to trade in the spot markets. Forward sales represent a tool for managing price risk, and forward transactions have become highly integrated with physical transactions. Today, traders rarely contract to buy or sell oil without concurrently assuming an appropriate offsetting position in a forward market to protect themselves against adverse price movements.

Other changes in pricing institutions that complemented the move to more flexible markets included a greater use of spot sales (for delivery within one month), futures markets, and long-term contracts with prices tied to futures or spot prices (see Box 1).

The major implication of the policy shift from price controls to relying on free markets is that the price of oil now more fully and quickly reflects the consequences of a disruption of world oil supplies. Because prices in the domestic market can adjust completely, consumers of oil products have a greater incentive than otherwise to make full use of whatever capabilities they have to shift to other fuels or to consume fewer oil-intensive goods and services. Also, oil producers have a greater incentive than before to make full use of existing capabilities to increase their output.

A Bigger Response of Oil Imports for Current Use: Capabilities for Substitution. Some analysts point to a growth in the capability for substitution since 1973. According to them, businesses in some sectors of the economy have invested in capacity that allows them to shift quickly among energy sources. For example, data on multiple-fuel capacity in place in manufacturing and electricity generation suggest greater short-term capability for substituting fuels today.[1] (Fuel switching reflects an ability to substitute one energy source for another with no significant modifications to equipment, while keeping production constant.)

Yet other analysts argue that the capability for substitution may be on the wane. They point out that much of the drop in oil use in recent years has stemmed from declining output in formerly oil-intensive manufacturing sectors, gains in automobile efficiency, population shifts to more temperate regions of the country (that is, regions where oil is not the

1. Energy Information Administration, *Manufacturing Fuel-Switching Capability 1988*, DOE/EIA-0515(88) (September 1991).

primary fuel for home heating), and the replacement of oil heating units in many residential and commercial structures. Since the transportation sector--road, air, and water travel--continues to depend almost exclusively on oil products, further comparable reductions in oil use in response to future price increases will not be forthcoming unless such price increases are much larger than in the past.

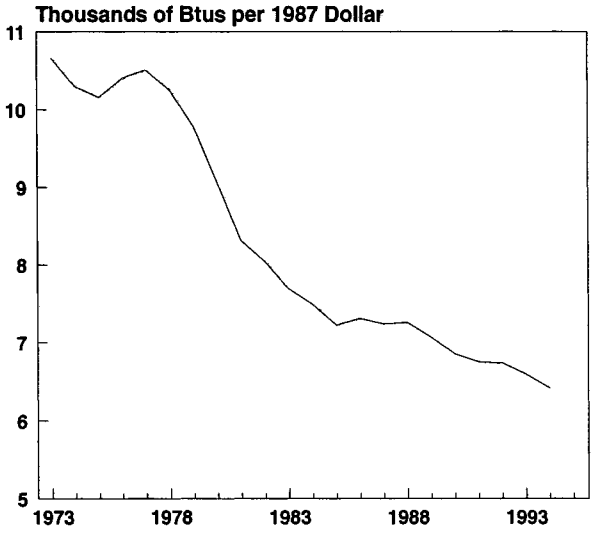
Moreover, on the supply side, the nation's oil fields are more depleted today and less able to increase production in response to higher prices. Aside from large discoveries in northern Alaska and the offshore regions of the lower 48 states in the 1970s, much of the nation's oil output comes from producing regions that were at their peak 20 years ago. The oil fields of Texas, Louisiana, and Oklahoma, which accounted for one-third of total domestic oil production in 1993, produced only half as much oil in that year as in 1973.[2]

Regardless of whether actual capabilities for substitution today are greater or less than in the past, the evidence of the past 20 years on how consumers and businesses actually responded to higher oil prices is clear. The economy is much more flexible than policymakers originally assumed it was (see Figure 1). Consumers have demonstrated a willingness to reduce discretionary driving--for example, by consolidating shopping trips and vacationing closer to home. Over time, they have made greater use of public transportation and shifted their demands away from oil-intensive goods and services. Similarly, businesses have demonstrated a capability to substitute telecommunications for air travel, purchase goods and services produced closer to home, and relocate to more temperate climates. That evidence supports the view that the threat of economic loss from a supply disruption of any given size is more benign today.

A Smaller Rise in Speculative Demand for Stocks: Growth of Futures Markets. A further element of structural change that affects how oil markets respond to price shocks has been the emergence of petroleum futures markets and other pricing institutions for managing uncertainty, in which participants can lock in prices today for oil to be delivered in the future.[3] The growth of the futures markets for crude oil and petroleum products has come hand in hand with the decontrol of oil prices, the entry of new suppliers (including new countries and new companies), the development of other new markets for buying and selling oil (including spot markets, forward markets, and options markets), and the declining use of administered pricing relationships and long-term supply contracts. Futures contracts represent a low-cost alternative to fixed-price contracts and oil inventories for managing price and supply risk (see Box 2).

Facing oil price shocks and significant market uncertainty about price, oil producers and consumers

Figure 1.
Oil Use per Unit of Real Gross Domestic Product, 1973-1994



SOURCE: Congressional Budget Office based on data from the Energy Information Administration and the Bureau of Economic Analysis.

NOTE: Btus = British thermal units.

2. Energy Information Administration, *U.S. Crude Oil, Natural Gas, and Natural Gas Liquids Reserves*, DOE/EIA-0216 (various issues).

3. A recent study discussing the importance of futures markets is Philip K. Verleger Jr., *Adjusting to Volatile Energy Prices* (Washington, D.C.: Institute for International Economics, November 1993). For a discussion of the importance of changing market institutions, see Richard D. Farmer, "Forward Markets and Changes in Macroeconomic Performance: The Case of Oil," *Journal of Macroeconomics*, vol. 15, no. 3 (Summer 1993).

Box 2.
Some Common Questions About Futures Markets

What Is a Futures Contract?

A futures contract requires the seller (buyer) of the contract to make (accept) delivery of a specified quantity of a commodity on a specified date in the future. If the purchaser holds the contract until the delivery date, the delivery price will be the sales price for the contract. However, these standardized contracts may be resold many times before the specified delivery date. Further, like other financial derivatives, the value of the contract must ultimately reflect the prices in other closely related markets. In particular, the futures price at the time of delivery must match the going price for spot (or cash) sales of comparable quality oil.

Where Are Futures Contracts Traded?

Futures are traded on commodity futures exchanges--nonprofit corporations regulated by the U.S. Commodity Futures Trading Commission. Brokers, who are members of the exchange, execute orders to buy or sell futures on the behalf of individual traders. The exchange provides a clearinghouse function, accounting for all trades and ensuring settlement. The exchange also supervises the conduct of trade and provides information processing and dissemination services (for example, price reporting).

How Are Futures Contracts Traded?

Trading strategies can be very complex, but the two basic transactions are the short and the long positions. Traders take a short position when they sell a contract, thereby obligating themselves to deliver the commodity ("short" because traders commonly do not possess the product they are selling). They take a long position when they buy a contract. Traders can use futures to help guarantee their future profits because the value of an appropriate futures position (long or short) will move in the opposite direction of the traders' cash market position. For example, when a refiner's purchase costs for crude oil rise (otherwise lowering its profits), the value of a long position in oil would rise too, helping to offset that loss.

who use futures markets can reduce their exposure to that uncertainty without building or holding onto inventories to the extent they otherwise would. The implications of decreased reliance on inventories for changes in oil imports are straightforward. In response to higher prices, oil consumers can meet a greater part of their current oil needs by drawing down their own stocks, hence reducing their oil purchases. Also, domestic producers can satisfy more customers by drawing down their own inventories, hence increasing their oil sales. Fewer purchases and higher domestic production result in lower oil imports.

Diversification and Companies' Concerns with Loss of Supply. Concern over the inability to secure needed oil during a supply disruption may also be smaller today. Internationally, the number of oil-exporting nations has increased, and the large oil companies have worked to diversify their sources of oil. Thus, oil-exporting nations find it more difficult to cut off supplies totally to individual companies or countries. As a result, individual oil companies experience less uncertainty and, again, demand is lower for inventories during a period of supply disruption.

Contrasting the Persian Gulf Crisis with Past Disruptions. A comparison of the Persian Gulf crisis of 1990 and 1991 with the Arab oil embargo of 1973 and 1974 provides perhaps the clearest example of how much the oil market's response to supply disruptions has changed over time.[4]

In past disruptions, as illustrated by the 1973-1974 embargo, refiners held onto oil stocks as prices rose, not knowing how much higher prices might go (see Figure 2). Incentives for suppliers to hold onto or even add to stocks constrained total oil supplies further and added to upward price pressures. Also pushing up apparent demand and prices at the same time were additional demand from retailers and small distributors (to add to their own storage) and more

4. See Congressional Budget Office, "Understanding the Volatility of Oil Prices During the Iraq-Kuwait Crisis," CBO Staff Memorandum (January 1991).

frequent purchases by gasoline consumers in the face of rising prices. Petroleum price controls in effect at that time did two things: they helped to limit increases in consumer prices, thereby fueling the growth in demand, and they capped domestic crude oil prices, which actually caused domestic production to drop.

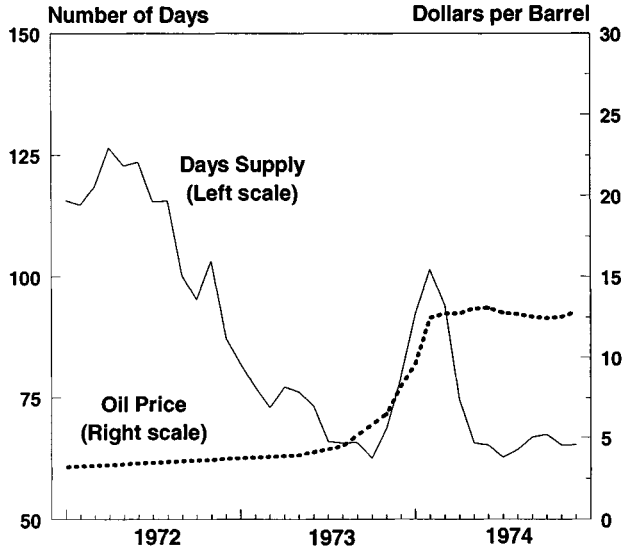
In the Persian Gulf crisis of 1990, demand for crude oil stocks changed little despite the dramatic price rise (see Figure 3). The change that did take place in the product markets was largely the result of normal seasonal movements in the markets for gasoline, heating oil, and residual fuel oil.

How the Economy's Response to Higher Oil Prices Has Changed

One of the most important changes that affect energy policy is the smaller effect that oil price shocks have on the economy today compared with the past. Two reasons account for that change. One has to do with structural changes in the oil markets themselves, as discussed in the preceding section, which have weakened the link between oil prices and economic output. The other is a diminished concern with inflation and its underlying structural causes, including the potential contribution of oil prices to inflation.

Structural changes in the economy at large have meant that the concern about high, uncontrollable inflation is less--especially since the recession of the early 1980s. Deregulation in transportation, less regulation in financial services, more flexible wages, and additional market-based pricing in natural gas and electricity markets all mean greater price flexibility. (The greater flexibility of wages is related to the diminished role of trade unions, downsizing in traditional union industries, greater self-employment and greater employment in the service sector.)[5] Growing competition from abroad for a wide array of

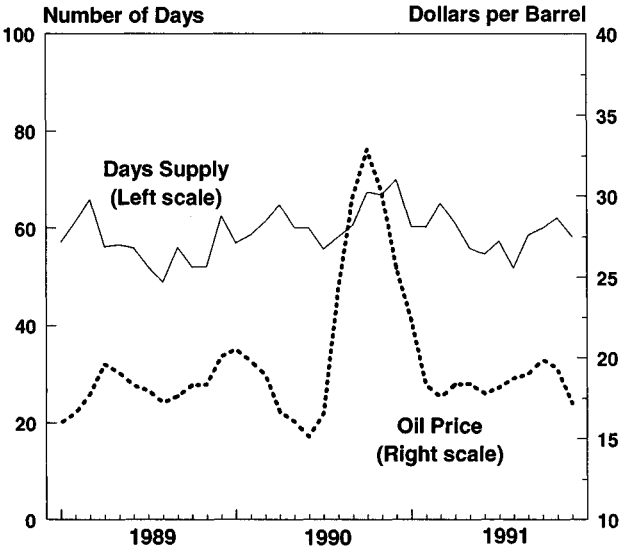
Figure 2.
Comparison of World Oil Prices and Days Supply of Stocks During the Arab Oil Embargo of 1973 and 1974



SOURCE: Congressional Budget Office based on data from the Energy Information Administration.

NOTE: Price represents acquisition cost to the refiner for imported crude oil. Days supply is the number of days that stocks could replace net petroleum imports.

Figure 3.
Comparison of World Oil Prices and Days Supply of Stocks During the Persian Gulf Crisis



SOURCE: Congressional Budget Office based on data from the Energy Information Administration.

NOTE: Price represents acquisition cost to the refiner for imported crude oil. Days supply is the number of days that stocks could replace net petroleum imports.

5. Henry S. Farber, "The Recent Decline of Unionization in the United States," *Science*, vol. 238 (November 13, 1987). Farber documents a decline in trade union membership from 25.6 percent of all nonagricultural workers in 1973 to 14.1 percent of those workers in 1985.

goods and services has also tempered rises in prices and wages in this country. Thus, when oil prices rise today, other commodity prices are under less pressure to increase than was previously the case.

Greater flexibility in oil prices is also apparent from several periods of falling oil prices--after 1981, in 1986, 1991, and again in 1993. Prices for oil products continue to be an important element of producer and consumer price indexes, despite some reduction in the oil intensity of certain manufacturing activities. However, one hears little discussion today about a resource-constrained or uncompetitive oil industry as a major underlying cause of inflation.

Not only are general prices unlikely to rise unchecked, but more people and businesses make use of financial instruments that yield returns at market rates. In addition, more people and businesses have salaries or contract prices tied to inflation. Thus, many of the adverse consequences of inflation, such as the declining real incomes of people on fixed wages and disincentives for businesses to invest in physical capital, are not as big a concern today. That is not to say that inflation is no longer a concern for public policy. Adverse responses to the basic rate of inflation still take place, though to a lesser degree, and adverse business responses to uncertainty about the inflation rate definitely remain a concern.

How the Threat of Oil Supply Disruptions Has Changed

Much of the economic rationale for government programs to reduce oil use and increase domestic oil production rests on the view that the risk of disruptions of imported oil supply grows with the level of oil imports.[6] Examples of such government programs include financial support for research and development of energy-saving technologies and alternative fuels plus various tax incentives for domestic oil producers.

Support for the perception of growing exposure to supply disruptions arises from the belief that a growing share of world supplies must inevitably come from the historically unstable Middle East. That notion, however, fails to account for two fairly recent changes--greater diversity of supplies and growing economic interdependence. Greater diversity of supplies reduces the size of disruptions the nation is likely to face. In turn, growing economic interdependence reduces the likelihood that politically or economically motivated disruptions would occur in the first place. At the same time, growing international interdependence and liberalization of trade also make it more difficult for the United States to isolate itself from world events through policies that would reduce oil imports.

Diversification in the Sources of Oil and Sources of Energy Is Increasing

The rate of discovery and development of oil resources worldwide has far outpaced the growth in demand in the past 20 years. Moreover, much of the growth in the oil supply has been outside the Middle East. Thus, although the Persian Gulf nations accounted for 37 percent of world oil production in 1973, the same countries accounted for only 28 percent in 1993.[7] The production shares for the Organization of Petroleum Exporting Countries, including members outside the Middle East, declined from 55 percent to 43 percent over the same period.

The emergence of new sources of oil came about in part as a response to the jumps in oil prices during the 1970s. With higher prices, deposits that geologists had identified earlier became profitable to explore and develop. Especially noteworthy were the large developments in the North Sea, Mexico, and Alaska. Combined British and Norwegian production of crude oil rose from zero to 2.9 million barrels per day during the decade after 1973; Mexican production increased by 2.2 million bbl/day; and Alaskan production increased by 1.5 million bbl/day. The

6. Department of Energy, *Project Independence Report* (1974).

7. Energy Information Administration, *Monthly Energy Review*, DOE/EIA-0035 (various issues). The Persian Gulf nations are Bahrain, Iran, Iraq, Kuwait, Qatar, Saudi Arabia, and the United Arab Emirates.

region of the former Soviet Union also became a major exporter of crude oil and oil products in this period. Furthermore, smaller oil discoveries cropped up all over the world.

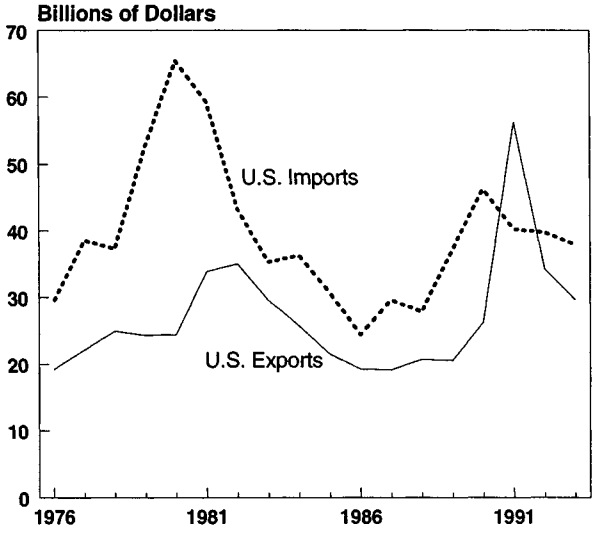
One may further challenge whether dependence on imports is a growing problem by looking at the use of all forms of energy. In 1973, U.S. net imports of all forms of energy (including crude oil, coal, natural gas, and hydroelectricity) accounted for 17 percent of the nation's total energy use. In 1993, the comparable figure had risen to only 20 percent. Meanwhile, the contribution of oil from the Organization of Petroleum Exporting Countries to the total world supply of all energy forms fell from about 27 percent to less than 16 percent.

Growing Financial Interdependence

What has also changed over the past 20 years has been the financial incentive of oil-exporting nations to curtail oil supplies. In the first decade following the price explosion of 1973 and the new-found independence of oil-exporting countries in making pricing decisions, the economies of many of the oil-exporting countries were unable to generate sufficient internal demand for goods and services to spend all of their new-found wealth. As a result of that problem of absorption, disrupting the flow of foreign capital carried little political cost. That is, since those countries had a hard time spending all of their money, they were more willing to interrupt that capital flow than they otherwise would have been. Today many of those same countries once awash in cash now run trade deficits, and most of their capital investments are in the West (see Figure 4).

According to Department of Commerce data, although the countries of the Gulf Cooperation Council (Saudi Arabia, Kuwait, Bahrain, the United Arab Emirates, Qatar, and Oman) accounted for a total of $13 billion in exports to the United States in 1992, those same countries imported $11 billion worth of goods from the United States.[8] In short, the overall trade surplus of those countries with the United States is much smaller than the total value of their oil sales here. In that same year, Saudi Arabia ran a deficit of $19.4 billion on its overall current account (including trade in merchandise and services) with the rest of the world.[9]

Figure 4.
United States' Trade with OPEC in Goods, Services, and Income, 1976-1993



SOURCE: Congressional Budget Office based on data from the Bureau of Economic Analysis, *Survey of Current Business* (various issues), Table T.

NOTES: U.S. exports include U.S. government grants.

OPEC = Organization of Petroleum Exporting Countries.

Not least, progress in 1993 and 1994 toward resolving the long-lasting Israeli and Palestinian disputes and the 1994 peace treaty between Israel and Jordan may improve the stability of oil markets. The unsuccessful Arab effort to interrupt supplies in 1967 and the successful effort in 1973 were both related to conflicts with Israel.

Granted, the Mideast is still a risky place. Growing Islamic fundamentalism in particular threatens political stability throughout the region. But the increasing interdependence of the Mideast economies and the industrialized nations makes it probable that

8. Reported in *Oil Daily*, January 14, 1994, p. 5.

9. International Monetary Fund, *International Financial Statistics* (August 1994).

Box 3.
Recent Developments in Oil Markets

World oil prices have continued on a mostly downward trend since the spring of 1991 and the end of the Persian Gulf crisis. But numerous spikes and dips have marked that downward trend for the past three years, which is consistent with the view that price volatility is a permanent feature of oil markets today.

Upward movements in prices in mid-1992 resulted in part from renewed economic growth in the United States and from the limited success of the Organization of Petroleum Exporting Countries in restraining output as Kuwait resumed exports of oil. More recently, in the first half of 1994, oil prices rose again on the strength of the U.S. economy, political turmoil in Nigeria (and the threat of a strike by oil workers), and problems with oil production platforms in the North Sea. Increasing demand for oil from the rapidly expanding economies of East Asia continues to place upward pressure on oil prices as well. But undermining the prospect of further price rises throughout this period has been the potential return of Iraq to the world oil market and, more recently, low economic growth in both Europe and Japan.

Adding to those past price swings and likely to contribute to future price movements is the great uncertainty surrounding the outlook for oil production in the states of the former Soviet Union and the normal vagaries of weather and accidents (involving tankers, pipelines, and refineries).

Many forecasters point to rising oil prices in the future. For example, the Energy Information Administration projects that prices could rise on average by nearly 3 percent a year over the next 10 years (in constant dollars).[1] However, the experience of the past few years suggests that the ride to higher prices will not be a smooth one.

1. Energy Information Administration, *Annual Energy Outlook*, DOE/EIA-0383(93) (January 1993), Table A-1.

some oil exporters would suffer on net from any shock to the world economy caused by higher oil prices.

Economic Integration Is Growing Worldwide

Some analysts question whether the United States can insulate itself from disruptions of the world oil supply by reducing its direct dependence on oil imports. Regardless of how little oil the United States imports, the nation's non-oil-producing trading partners will still be subject to any disruptions in world supply. Moreover, any economic losses those trading partners incur as a consequence of disrupted supplies and increased oil prices would still adversely affect the U.S. economy.

The exposure of the U.S. economy to worldwide economic events has been increasing over the past two decades with the growing contribution of trade to the nation's overall economic activity. For example, total U.S. exports of goods and services as a percentage of gross domestic product have grown from about 6 percent in 1973 to over 11 percent in 1993.[10] In sum, the growing integration of the world economies indicates a declining ability to insulate the U.S. economy from events in world oil markets.

Examining Price Volatility, Uncertainty, and Private Storage Decisions

Structural changes in the oil markets and the U.S. economy suggest that a given increase in world oil prices may have a smaller adverse impact on the U.S. economy today than in the past. Nevertheless, some of those same changes mean that oil prices today can rise faster and higher in response to a loss of supplies and that oil prices in the aftermath of a supply loss

10. Council of Economic Advisers, *Economic Report of the President* (February 1994), Table B-2.

will be more volatile and uncertain than was true before. Price movements during supply crises are much more complicated than a single, one-time increase. The additional volatility of oil prices and changes in the way the market responds to changes in the outlook for prices and uncertainty have important implications for both the total cost of supply disruptions and the effectiveness of emergency energy policies.

Oil Prices Are More Volatile Today

Small changes today in the current supply or in the outlook for supply can lead to large movements in oil prices--both up and down--within a short time frame. High volatility of prices arises frequently in oil markets because both oil supply and demand are relatively unresponsive to price change. As a result, oil prices have to rise or fall by large amounts to bring supply and demand into balance when even small changes occur in the availability of oil supplies or in consumer requirements (see Box 3).

The fact that price volatility is greater today than in the past reflects the combined effect of price decontrol, more competition among suppliers, and greater price visibility (largely as a result of futures trading). Those changes have outweighed any contribution to greater price stability that would come from an increased capability of oil consumers to substitute oil products on short notice for other forms of energy --if indeed capabilities for substitution are greater.

With decontrol of prices and greater competition, oil prices today serve a more important role in stabilizing the market--rising and falling to bring demand into line with supply. In the years when a few large oil companies dominated the oil markets, reported oil prices were little more than internal transfer costs and changed very little. When independent oil companies and national oil companies emerged in the 1960s and early 1970s, prices changed only slowly because sales were made largely under the terms of long-term, fixed-price contracts. Moreover, throughout the 1970s, average prices reflected the restrictions of price controls here and abroad. In those circumstances, oil prices did not always keep supply and demand in balance. Supply shortages often alternated with gluts on the market.

A larger share of crude oil and refined products is currently sold on a spot basis (for delivery within a month or two), with flexible prices, than was previously the case. And contract prices even for oil sold under longer-term contracts are commonly tied to prices reported in the oil futures markets, which change continuously in response to new information about supply and demand. Futures contracts, spot sales, and longer-term contracts form a single, highly integrated market, with prices for crude oils of various qualities and refined products to be delivered at different locations and times all moving together. In this new environment, price movements are more visible to the public than in the past.

Price Volatility Can Lead to Price Uncertainty

Price volatility is a concern today not just because it is potentially greater than in the past, but because volatility is closely linked to market uncertainty. Uncertainty can affect producer and consumer decisions about the storage of oil in ways that can exacerbate a supply crisis.

Uncertainty about prices reflects underlying uncertainty about changing levels of supply and demand. Such uncertainty may reflect a current assessment of the probability of a single large change in future supply or demand. It may also reflect the likelihood of frequent changes in supply or demand. Or it may reflect structural conditions that would cause any particular change in supply to have a bigger, harder-to-predict impact on prices than otherwise. If one focuses on the frequency of changes and on structural conditions affecting the size of price adjustment, price uncertainty will be greater wherever prices are more volatile.

Prices Can Be Even More Uncertain During a Crisis

Given the basic structure of oil markets, oil prices can be even more volatile and uncertain during major supply disruptions for two reasons. First, an increased frequency of smaller changes in supply--both

actual and threatened--usually accompany large supply losses. Second, if the loss of supply diminishes the worldwide buffer of excess capacity to supply oil, the world supply of oil can become even less responsive to price changes during a supply crisis.[11]

The availability of excess capacity means that additional quantities of oil can enter the market from the private sector at only small increments in price. Without the buffer, businesses may expect oil prices in the future to be more volatile in the face of further changes in supply or demand, since bigger price movements are needed to balance changes in supply and demand than would otherwise be the case.

11. The importance of this supply buffer is discussed in Congressional Budget Office, "Understanding the Volatility of Oil Prices During the Iraq-Kuwait Crisis."